Particulate Matter

INFORMATION

IDEM

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

EST. 1986

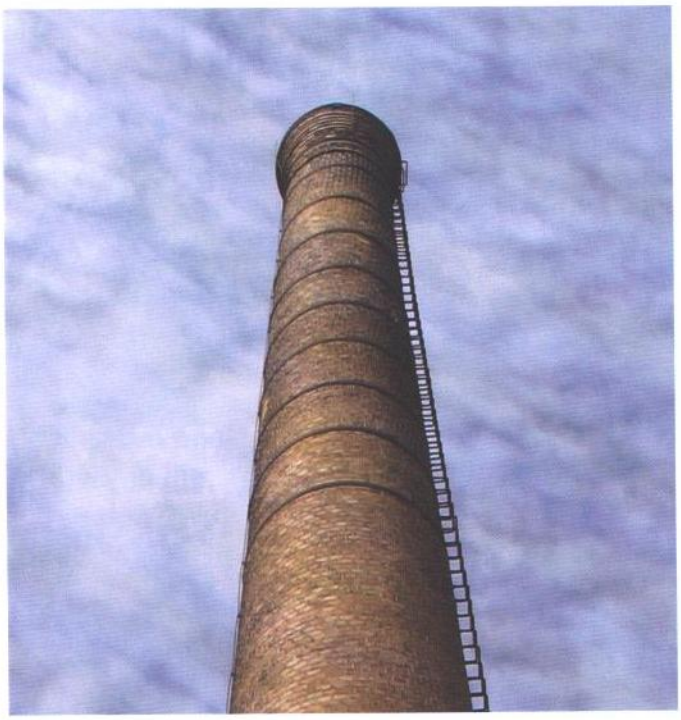
Agency Overview

IDEM's approach to air quality
The Indiana Department of Environmental Management (IDEM) works to improve air quality in Indiana by implementing federal and state air quality regulations. By issuing permits, providing compliance assistance, conducting inspections, offering incentive programs and creating materials for educational outreach, the agency protects human health from poor air quality.

IDEM, in coordination with local air pollution control agencies, monitors air quality in Indiana. Data collected from 42 Indiana fine particle ($PM_{2.5}$) monitoring sites is evaluated and shared with the United States Environmental Protection Agency (U.S. EPA).

When air quality might reach levels that may affect public health, IDEM calls an Air Quality Action Day (AQAD). These public alerts are available on the SmogWatch Web site or toll free at (800) 631-2871. SmogWatch AQAD alerts can be received via e-mail.

IDEM's daily air quality forecasts and SmogWatch AQAD alert signup are available at www.smogwatch.IN.gov .



Glossary

AirNow – U.S. EPA Web site that provides the public with easy access to national air quality information. www.airnow.gov

Air Quality Action Day (AQAD) – A forecast to alert the public that air quality may affect health. IDEM issues alerts to local officials, media and citizens via press releases and e-mail messages.

Coarse particles – Particulate matter that is between 2.5 – 10 microns in diameter.

Fine particulate matter or fine particles – See $PM_{2.5}$

Local air pollution control agency – Local government agencies authorized by IDEM to issue air permits, conduct compliance inspections, conduct air monitoring or carry out regulatory actions at the local level on behalf of the state. Vigo County, Anderson, Evansville, Gary, Hammond and Indianapolis all have a local air pollution control agency.

Monitor – Equipment used to measure air quality.

Particulate Matter (PM) – A complex mixture of extremely small particles and liquid droplets including acids, organic chemicals, metals, soil and dust particles.

$PM_{2.5}$ – Particulate matter that is 2.5 microns in diameter or smaller.

PM_{10} – Particulate matter that is 10 microns in diameter or smaller.

Smog – Term commonly used to describe poor air quality caused by ground-level ozone or particulate matter.

SmogWatch – IDEM Web site that provides the public with easy access to Indiana's air quality information.
www.smogwatch.IN.gov

Fine Particulate Matter

What is particulate matter?
Particulate matter is the term for particles suspended in the air including dust, dirt, soot, smoke and liquid droplets. Some particles are large or dark enough to be seen as soot or haze. Others are so small that they can only be individually detected with an electron microscope.

Where does particulate matter come from?
Industrial and residential combustion, vehicle exhaust and wood burning creates particulate matter. Non-combustion particulate matter comes from unpaved roads, tilled fields, construction sites and stone crushing.

What are the sizes of particulate matter?
PM_{10} is particulate matter that is 10 microns in diameter or smaller. Fine particulate matter ($PM_{2.5}$) is particulate matter 2.5 microns in diameter or smaller. To put the particles in perspective, a human hair is approximately 70 microns wide and fine beach sand is approximately 90 microns wide.

Why are we most concerned with $PM_{2.5}$?
$PM_{2.5}$ is more difficult for filters to catch and stays in the air for longer periods of time than larger particulate matter. When inhaled, it goes deeper into the lungs and the body cannot easily remove it.

What are the health effects of $PM_{2.5}$?
$PM_{2.5}$ can irritate lung airways and cause inflammation. Symptoms include wheezing, coughing, chest pain during deep breaths and breathing difficulties during exercise or outdoor activities.

Breathing particulate matter has been linked to a series of significant health problems, including aggravated asthma, increases in respiratory symptoms like wheezing and coughing, chronic bronchitis, decreased lung function and premature death. Even at low levels, $PM_{2.5}$ can trigger a variety of health problems. These health effects are of concern to everyone who works, plays or spends time outdoors. People with respiratory problems, children and the elderly are most vulnerable, but even healthy people who are active outdoors can be affected when $PM_{2.5}$ levels are high.

How does IDEM measure air quality?
Each day, air quality data is collected from a network of air monitoring stations located across the state. When data from these monitors indicate conditions are right for unhealthful levels of $PM_{2.5}$, IDEM will call an Air Quality Action Day (AQAD) to alert the public to take precautions and to avoid particulate matter-generating activities until the health threat has passed. IDEM works with TV, radio and newspapers to inform the public about an AQAD.

How can I protect myself from $PM_{2.5}$?
Listen for AQAD alerts through your local media. To get air quality information directly from IDEM, sign up for SmogWatch e-mail at www.smogwatch.IN.gov .

As a precaution, avoid physical exertion whenever $PM_{2.5}$ levels are high. This is especially important for children, the elderly and people with lung and heart diseases. When possible, limit outdoor activities and stay indoors when air quality is poor.

Particulate Matter

Pollutant	Symbol	Major Man-made Sources	Human Health & Welfare Effects	Control Methods
Particulate Matter Airborne solid particles and liquid droplets	**PM**	Power plants, steel mills, unpaved roads and parking lots, wood burning stoves and fireplaces, chemical plants and automobiles	Can get deep into your lungs, or even enter your blood stream, and cause serious health problems; increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing; decreased lung function; aggravated asthma; development of chronic bronchitis; irregular heartbeat; non-fatal heart attacks; and premature death in people with heart or lung disease; impairs visibility (haze)	Pollution control equipment and reduction of fuel combustion

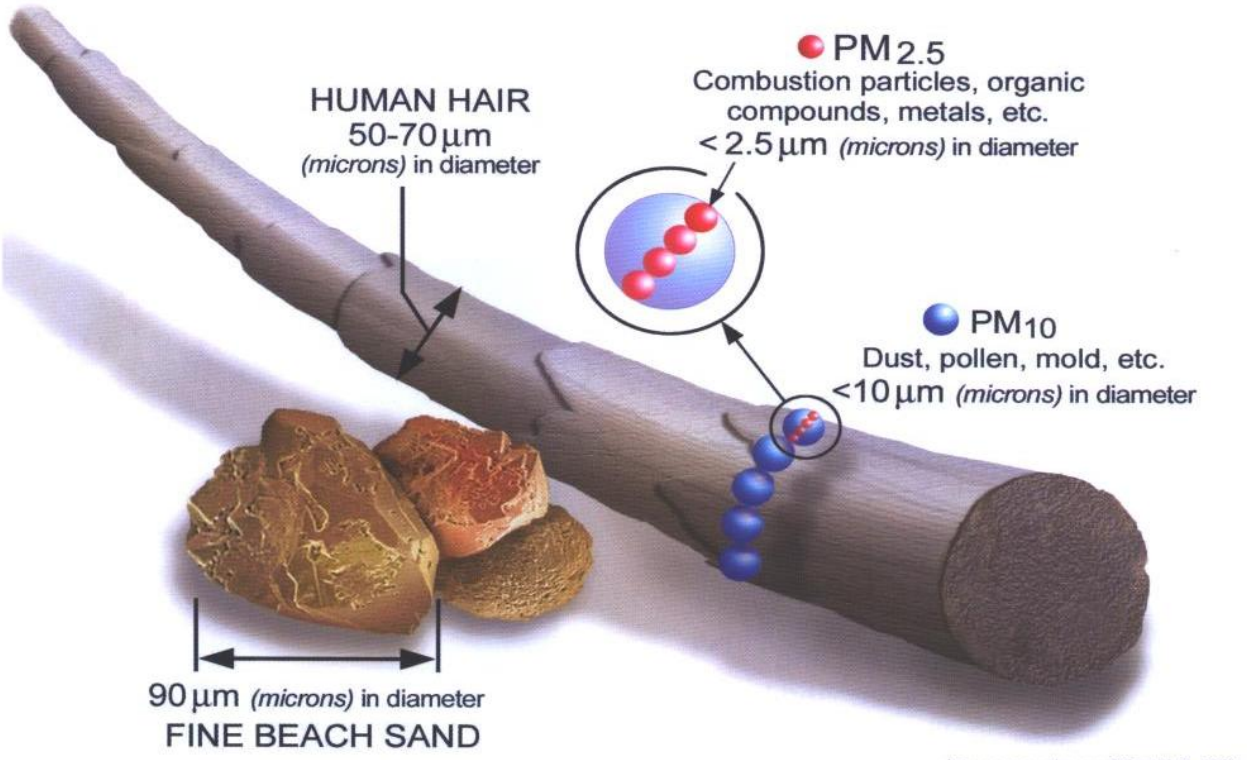


Image courtesy of the U.S. EPA

Particulate matter is dust, soot, liquid, metal or any other solid matter suspended in the air. Particulate matter is measured by filtering out particles larger than 10 microns wide to find PM_{10} levels or 2.5 microns wide to find $PM_{2.5}$ levels. $PM_{2.5}$ is so small that the body has a hard time expelling it from the lungs.

AIR QUALITY INDEX

The Air Quality Index rates the air quality of a particular region based on the forecasts made for ozone, fine particulate matter, carbon monoxide, sulfur dioxide and nitrogen dioxide. The forecast levels are color coded to indicate the potential health impact. Compare the daily air quality forecast in your region on www.smogwatch.IN.gov with the chart below to see how $PM_{2.5}$ may affect you.

LEVELS OF HEALTH CONCERN	CAUTIONARY STATEMENTS
GOOD	Air quality is considered satisfactory and air pollution poses little or no risk.
MODERATE	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
UNHEALTHY FOR SENSITIVE GROUPS	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
UNHEALTHY	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
VERY UNHEALTHY	Health alert: everyone may experience more serious health effects.
HAZARDOUS	Health warnings of emergency conditions. The entire population is more likely to be affected.

www.smogwatch.IN.gov
(800) 631-2871

SmogWatch

How does IDEM monitor $PM_{2.5}$ levels?
IDEM and local air pollution control agencies monitor air quality at 42 $PM_{2.5}$ monitors located throughout the state.

How does IDEM forecast poor air quality?
Forecasters use current monitored data and weather forecasts to predict fine particulate levels for the next day.

If $PM_{2.5}$ is forecasted to reach levels that may affect public health, IDEM issues an Air Quality Action Day (AQAD) alerts to one or more of the seven SmogWatch regions.

AQAD alerts are similar to thunderstorm or tornado warnings in that the alert is issued to a large area that may be affected. Not all of the area under the forecast may experience poor air quality, but everyone is encouraged to take actions to protect their health and reduce actions that cause $PM_{2.5}$.

How do I find out what the current $PM_{2.5}$ forecast is?
Indiana's SmogWatch information is available on the Web at www.smogwatch.IN.gov, or by calling (800) 631-2871. For $PM_{2.5}$ forecasts across the rest of the country, visit U.S. EPA's AirNow Web site at www.airnow.gov .

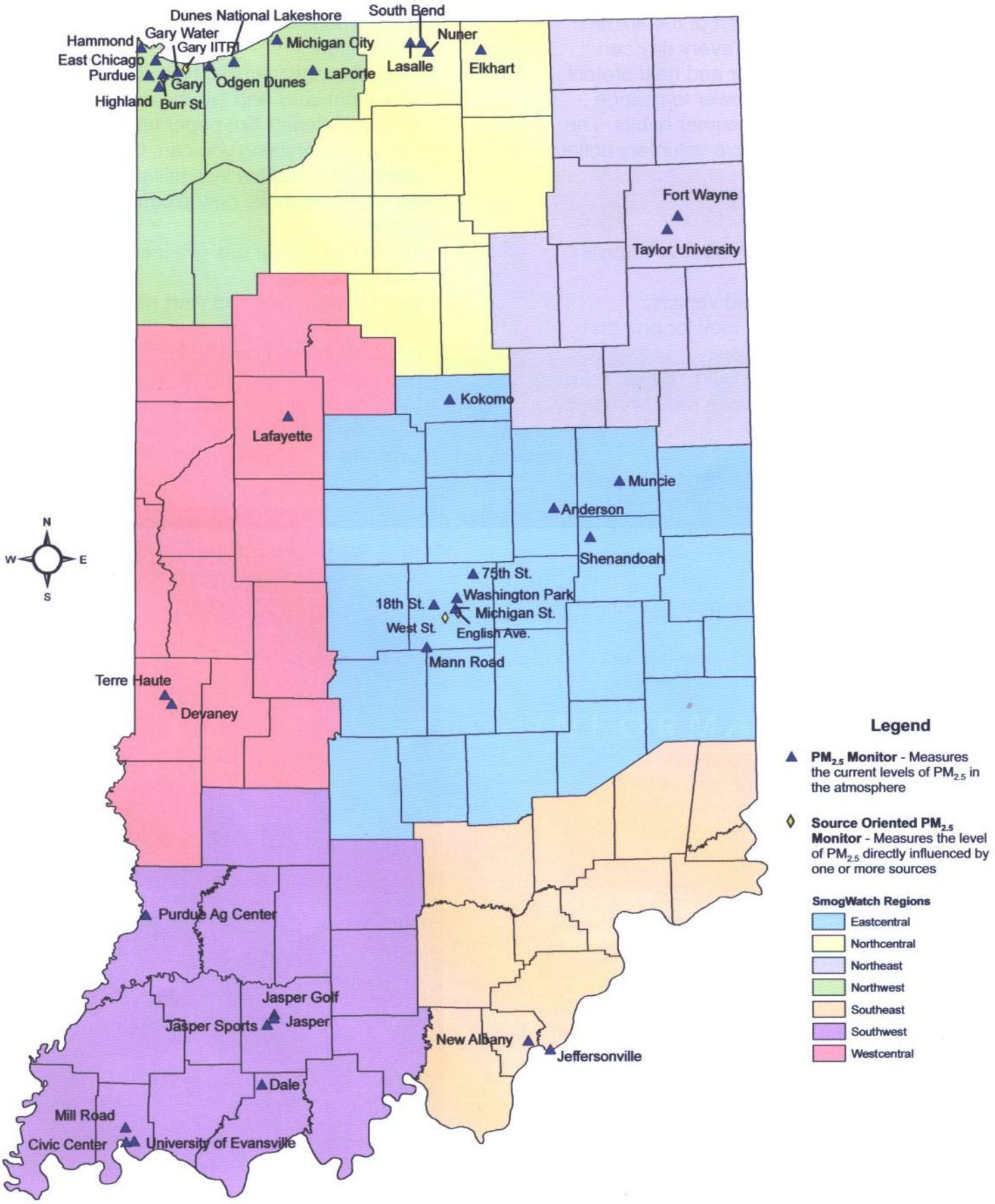
How does IDEM notify the public about AQAD alerts?
AQAD alerts are sent out through a multi-media approach to reach as many Hoosiers as possible. When an AQAD is forecasted, IDEM, the City of Indianapolis, the City of Evansville and other air quality partners send out a press release to the local print, radio and television media.

AQAD alerts then appear in the newspaper, on the television, over the radio and even on electronic billboards.

How can I sign up to receive AQAD alerts?
Citizens can receive AQAD alerts by signing up on the SmogWatch Web site at www.smogwatch.IN.gov . SmogWatch AQAD alerts are sent via e-mail. Check with your local air pollution control agency to see if they send out AQAD alerts as well.

SMOG WATCH

PM Air Monitoring Stations



Your Actions Count!

How can you reduce particulate matter?
Each one of us can be a part of the solution. The choices that we make every day can decrease particulate matter and help protect our health. We have the power to change our transportation and consumer habits. The following list suggests simple voluntary actions and ways you can help:

In your car, you can...

- Limit driving on unpaved roads and drive slowly.
- Drive an alternative fueled vehicle.
- When buying a new car, look for one that gets more than 35 mpg.
- Drive the speed limit. Driving 10 mph more than the speed limit reduces gas mileage by 15 percent.
- Avoid excessive idling.
- Accelerate gradually, maintain the speed limit, and use cruise control on the highway.
- Limit driving whenever possible, especially during heavy traffic periods. Use public transit, carpool, walk or ride a bike.
- Walk inside instead of using drive-thru windows.
- Combine your errands into one trip and park centrally, walking as much as possible.

At work you can...

- Use energy-efficient computers and lighting.
- Turn off all unused equipment and lights.
- Take the stairs instead of the elevator.
- Keep fleet vehicles well maintained.
- Recycle office paper and products.
- Buy products that have less packaging and are reusable.

At home you can...

- Improve air quality by reducing energy needs from power plants.
- Conserve energy by setting your thermostat higher in the summer and lower in the winter.
- Use energy-efficient lighting and appliances.
- Turn off appliances and lights when not in use.
- Use the microwave to cook small meals.
- Keep air conditioning and refrigeration systems well maintained.
- Change furnace filters monthly.
- Insulate your home, water heater and pipes.
- Keep woodstoves and fireplaces well maintained.
- Recycle paper, plastic, glass bottles, aluminum cans and cardboard.
- Reuse materials like paper bags and boxes.
- Recycle everything you can. It takes less energy and creates less pollution to recycle than it does to make new products from raw materials.
- Use an electric or gas grill instead of charcoal and lighter fluid.
- Don't burn leaves and yard waste; compost or mulch instead.
- Keep household paints, solvents and pesticides in air-tight containers.
- Mow your lawn after 6 p.m. on hot, sunny days. Do not mow on Air Quality Action Days.
- Limit the use of gasoline powered equipment.

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